CARGILL
SALT DIVISION

7220 Central Ave.
Newark, CA 94560-4206
510/797-1820 1-800-321-1458
Fax: 510/790-8189

March 26, 1996

Ms. Loretta Barsamian
Executive Officer
California Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, CA 94612

ATTENTION: Lila Tang ✓

Dear Ms. Barsamian:

Please find attached the self-monitoring report for the NPDES Permit No.CA0028690 for our Redwood City facility wet weather discharge of rainwater from our crystallizer beds.

Discharge of rainwater from the crystallizer beds occurred February 23 through February 29, 1996. Approximately 88 acre feet of water was discharged to First Slough in Redwood City. The field measurements showed a range of Baume readings from 2.8 to 3.5 and a pH range of 8.0 to 8.4. The laboratory measurement of TDS was 31,300 mg/l and laboratory measurement of pH was 8.43.

Slightly elevated levels of nickel were found during this sampling period. Nickel was found at a concentration of 0.011 mg/l exceeding the discharge limit of 0.0071 mg/l. It also should be noted that due to matrix interferences in the laboratory, the detection limit for silver was raised above the discharge limit. Silver was below the detection limit but it is not known whether it exceeded the discharge limit.

I apologize for the delay in submitting this report. As noted in the laboratory write-up, there was a mix up in the turnaround time at the lab which caused the delay in obtaining the results.

As always, please feel free to call with any questions.

Minor violation of nickel limit.
No followup necessary at this time.
Cargill's investigated previously and
could not find process source.
LWT
4/9/96

2213.7125

" I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering information, the information submitted is , to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations [40 CFR 122.22(d)]."

Sincerely,

Barbara N. Ransom
Environmental Manager

cc: U.S. Environmental Protection Agency

B. APPENDIX B.

COMPLIANCE EVALUATION SUMMARY

b. COMPLIANCE EVALUATION SUMMARY

Effluent Limitations

1. The discharge of Waste No. 1 containing constituents in excess of following limits is prohibited.

Constituents	Units	Maximum	Results
Total Dissolved Solids	mg/l	32,000	2.8-3.5 Be (in field) 31,300 ppm (laboratory)
Biochemical Oxygen Demand Five day	mg/l	20	<10 mg/l
Arsenic	mg/l	0.020	<0.020 mg/l
Cadmium	mg/l	0.010	<0.005 mg/l
Chromium (VI)[a]	mg/l	0.011	0.005 mg/l
Copper	mg/l	0.020	0.010 mg/l
Lead	mg/l	0.0056	<0.005 mg/l
Mercury	mg/l	0.001	<0.00020 mg/l
Nickel	mg/l	0.0071	0.011 mg/l
Silver	mg/l	0.0023	<0.005[b] mg/l
Zinc	mg/l	0.058	<0.010 mg/l

[a]The Discharger may meet this limit as total chromium

[b]Detection limit is higher than discharge limit

		Results
2.	Waste No. 1 shall not have a pH less than 6.5 nor greater than 8.5	Ranged between pH 8.0-8.4 (field) 8.43 (lab)

3. The survival of test fishes of the species *Menidia beryllina* or silverside minnow is a 96 hour static bioassay of the discharge of Waste No. 1 shall be a median of 90 percent survival and a 90 percentile value of not less than 70 percent survival.

   Results: The results indicate that there was 70% survival in the 100% effluent sample at the end of 96 hours.

   According to our records, this is the fourth time that an acute toxicity test has been performed on effluent discharged from the Redwood City Crystallizer Pond. Of those four events, two have exhibited less than 90% survival and none have exhibited <70% survival. Therefore, according to the discharge permit, neither of the discharge limitations have been exceeded.

APPENDIX C.

MAP

CARGILL SALT

REDWOOD CITY


REDWOOD CITY
2
SF2
10
9
9A
DISCHARGE LOCATION:
FIRST SLOUGH
Bt
4
M
1
8
Belle Haven
9
Brine-M
5
6
CARGILL SALT
REDWOOD CITY FACILITY
CRYSTALLIZER RAINWATER DISCHARGE

APENDIX D.

LABORATORY DATA

APPENDIX D.

LABORATORY DATA

S. R. HANSEN & Associates Environmental Consulting

Ms. Barbara Ransom
Cargill Salt Company
Environmental Affairs
7200 Central Avenue
Newark, CA 94560-4206

25 March, 1996

Dear Barbara:

Enclosed, please find two (2) copies of the report entitled:

> Report of Acute Biomonitoring Test: Rainwater Discharge from Crystallizers; Collected 23 February, 1996. Redwood City Facility.

This report contains the raw data from the bioassay and the complete contract laboratory chemical analyses reports.

I appologize for the extreme tardiness of this report. We just received the chemical results from Quanterra today. Apparently, they logged in the wrong turn-around-time. I have spoken with them and they assure me that this will not happen again. Once again, I'm sorry for the inconvenience that this has caused.

If you have any questions, or require additional information, please contact me at your earliest convenience.

Thank You,

Gary G. Wortham
Laboratory Manager

4085 Nelson Avenue, Suite I • Concord, CA 94520 • (510) 687-5400 • Fax (510) 687-2296

REPORT OF ACUTE BIOMONITORING TEST

RAINWATER DISCHARGE FROM CRYSTALIZERS
COLLECTED 23 FEBRUARY, 1996

REDWOOD CITY FACILITY

Prepared for

Cargill Salt Company
7220 Central Avenue
Newark, CA 94560

Prepared by

S.R. Hansen & Associates
4085 Nelson Ave, Suite I
Concord, Ca. 94520

25 MARCH, 1996

1. INTRODUCTION

Beginning in February, 1992, S.R. Hansen & Associates began conducting static acute toxicity tests for the Cargill Salt Company in Newark, California as part of the compliance monitoring mandated in the facility's NPDES permit. This report describes the procedures used and the results obtained for acute toxicity tests and chemical analyses performed on a sample of Rainwater Discharged from the Crystallizers at the Redwood City facility between 22 - 23 February, 1996.

2. MATERIALS AND METHODS

Sample Collection - A 24-hr. composite sample of Rainwater Discharge from the Crystallizers at the Redwood City facility was collected by Cargill Salt Company staff on 22 - 23 February, 1996. The sample was stored in a pre-cleaned 2.5 gallon cubitainer, packed in an ice chest, and maintained at 4°C for transport to the S.R. Hansen & Associates (SRH&A) laboratory via SRH&A courier on 23 February, 1996. Toxicity tests were initiated on 23 February, 1996.

Test Organisms - Acute bioassays were performed using *Menidia beryllina*. The *Menidia* were obtained from an outside supplier (Aquatic Indicators, St. Augustine, FL).

Toxicity Test Procedures - *Menidia beryllina* (11 days old) were obtained from Aquatic Indicators (St. Augustine, FL.) and were held in a five gallon aquarium prior to use in the tests. The animals were exposed to the effluent for a period of 96 hours under static, (renewal at 48 hours) conditions. The test was performed at a salinity of 31 ppt. One-liter beakers were used for the exposures, with a total volume of 500 ml of effluent sample added to each beaker. Arrowhead Spring Water (salinity adjusted to 31 ppt using artificial sea salts, Tropic Marin) was used as the control and diluent. Ten fish were placed into each container, and each exposure was run in duplicate. Temperature, dissolved oxygen, pH, electrical conductivity, salinity, and number of dead organisms were recorded daily in each exposure.

Chemical Test Procedures - Representative aliquots of the effluent were sent to Curtis & Tompkins, LTD (Berkeley, CA) and Quanterra Environmental Services (Sacramento, CA) for analyses. The sample that was to be analysed for metals was preserved with ultra-pure (Ultrex) nitric acid while the total dissolved solids and BOD samples remained unpreserved. Both samples were refrigerated to 4°C and shipped in a cooler with frozen blue ice to the contract labs via SRH&A and overnight couriers.

3. RESULTS

The results of the acute toxicity tests and chemical analyses performed on the 23 February, 1996 Rainwater Discharge from the Redwood City Crystallizers are presented in Tables 1 and 2, respectively and can be summarized as follows:

3.1 ACUTE BIOASSAY TEST

The results from the acute toxicity bioassay using *Menidia beryllina* as the test indicator species indicates that there was 70% survival in the 100% effluent sample after 96 hours (Table 3-1).

3.2 CHEMICAL ANALYSES

Chemical analyses of the effluent sample that was discharged from the crystallizer between 22 - 23 February, 1996 indicate that one (1) of the metals that were analyzed (i.e., nickel) was present in detectable concentrations (Table 3-2). It should be noted, however, that the detection limit of silver was raised due to matrix interferences and, unfortunately was above the discharge limit. Based on this, we have no way to tell if silver exceeded the discharge limit. Analyses of previous samples collected from this site indicated that silver was not present in concentrations which would exceed the discharge limit.

TABLE 3-1. RESULTS OF 96-HR *MENIDIA BERYLLINA* BIOASSAY ON RAINWATER DISCHARGE FROM THE CARGILL SALT COMPANY REDWOOD CITY FACILITY CRYSTALIZERS (COLLECTED 22-23 FEBRUARY, 1996)

Concentration (% Effluent)	% Survival		AVERAGE
	Replicate A	Replicate B	
100	60	80	**70**
Control	100	80	**90**

TABLE 3-2. RESULTS OF CHEMICAL ANALYSES PERFORMED ON RAINWATER DISCHARGE FROM THE CARGILL SALT COMPANY REDWOOD CITY FACILITY CRYSTALIZERS (COLLECTED 22-23 FEBRUARY, 1996)

ANALYSIS	CONCENTRATION (mg/L)	DISCHARGE LIMIT (mg/L)
Salinity	31.3	---
pH	8.43	(>6.5 & <8.5)
Total Dissolved Solids (EPA 160.1)	31,300	32,000
BOD (EPA 405.1)	<10	20
Arsenic (Method 6020-M)	<0.020	0.020
Cadmium (Method 6020-M)	<0.005	0.010
Chromium (Method 6020-M)	0.005	0.011
Copper (Method 6020-M)	0.010	0.020
Lead (Method 6020-M)	<0.005	0.0056
Mercury (Method 245.1)	<0.00020	0.001
Nickel (Method 6020-M)	0.011*	0.0071
Silver (Method 6020-M)	<0.005**	0.0023
Zinc (Method 6020-M)	<0.010	0.058

* - Exceeds discharge limit
** - Cannot tell whether it exceeded discharge limit due to raised detection limits

4. CONCLUSIONS

The results of the the tests performed on the sample that that was discharged from the crystallizers at the Redwood City facility indicate that there were no exceedances in the fish acute bioassay and only one exceedance of the metal discharge limits. These are discussed in the following sections:

4.1 FISH ACUTE BIOASSAY

The results indicate that there was 70% survival in the 100% effluent sample at the end of 96 hours.

According to Regional Board guidance in the 1991 draft Basin Plan, the median and 90 percentile values are interpreted as follows:

> **11 Sample Median -** If five or more of the past ten samples have less than 90 percent survival, then survival of less than 90 percent on the next, eleventh, sample represents a violation of the effluent limitation.
>
> **90th Percentile -** If one or more of the past ten samples is less than 70 percent survival, then survival of less than 70 percent on the next, eleventh, sample represents a violation of the discharge limitation.

According to our records, this is the fourth time that an acute toxicity test has been performed on effluent discharged from the Redwood City Crystallizer Pond. Of those four events, two have exhibited less than 90% survival and none have exhibited <70% survival. Therefore, according to the discharge permit, neither of the discharge limitations have been exceeded.

4.2 CHEMICAL ANALYSES

The chemical analyses results indicate that only nickel was present in concentrations which exceeded the limits of the discharge permit and that silver may have exceeded the discharge limit. It should be noted, however, that, while it is possible that silver exceeded the discharge limit, previous analyses of water discharged from this site indicate that the silver concentration has always been <1 ppb.

Data sheets for these bioassay tests are provided in the Appendix to this report.

APPENDIX

LABORATORY DATA SHEETS

S.R. HANSEN & ASSOCIATES

ACUTE/CHRONIC TEST DATA SHEET

START DATE 2-23-96 TIME 1600 TEST MATERIAL Cargill Rainwater Rx DILUENT N/A
END DATE 2-27-96 TIME 1600 SPECIES/AGE M. bahia 11 days RENEWAL FREQUENCY @ 48 hr

CONC	TEMP° C	D.O. OLD	D.O. NEW	pH OLD	pH NEW	~~COND.~~ Sal (‰)	ALK.	HARD.	SURVIVAL A	SURVIVAL B	SURVIVAL C	SURVIVAL D	PREPARA
Control	25		7.8		8.23	31.0			10	10			
100%	↓		8.2		8.43	31.3			10	10			TIME: 160
													DATE: 2/
													ID: Ca
Cont	25	6.0		8.49		31.5			10	10			
100%	↓	5.9		8.55		31.3			6	8			TIME: 08
													DATE: 2/
													ID: Ca
Cont	25	6.0	7.4	8.41	8.61	33.8	30.4		10	8			
100%	↓	5.9	7.9	8.26	8.75	34.5	30.8		6	8			TIME: 12
													DATE: 2/
													ID: Ca
Cont	25	6.5		8.58		31.7			10	8			
100%	↓	6.4		8.53		32.6			6	8			TIME: 16
													DATE: 2/
													ID: Ca

S.R. HANSEN & ASSOCIATES

ACUTE/CHRONIC TEST DATA SHEET

START DATE 2-23-96 TIME 1600 TEST MATERIAL Cargill Rainwater RWX DILUENT N/A
END DATE 2-27-96 TIME 1600 SPECIES/AGE M. beneficiosa 11 D.O. RENEWAL FREQUENCY @ 48 h

CONC	TEMP° C	D.O.		pH		COND.	ALK.	HARD.	SURVIVAL				PREPA
		OLD	NEW	OLD	NEW				A	B	C	D	
Cont	25	6.0		8.59		32.3			10	8			
100%	↓	5.9		8.58		33.0			6	8 @			TIME:
													DATE:
													ID: Ga
													TIME:
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													TIME:
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													TIME
													DATE
													ID:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

ANALYTICAL REPORT

Prepared for:

S.R. Hansen & Associates
4085 Nelson Avenue
Suite I
Concord, CA 94520

Date: 08-MAR-96
Lab Job Number: 124544
Project ID: N/A
Location: Cargill Rainwater

Reviewed by: _____

Reviewed by: _____

Curtis & Tompkins, Ltd

LABORATORY NUMBER: 124544
CLIENT: S.R. HANSEN & ASSOCIATES
LOCATION: CARGILL RAINWATER

DATE SAMPLED: 02/23/96
DATE RECEIVED: 02/23/96
DATE ANALYZED: 02/29/96-
: 03/05/96
DATE REPORTED: 03/07/96

ANALYSIS: BIOLOGICAL OXYGEN DEMAND
ANALYSIS METHOD: EPA 405.1

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
124544-001	RWC CRYSTALLIZER	ND	mg/L	10
METHOD BLANK	N/A	ND	mg/L	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: BS/BSD

RPD, %	4
RECOVERY, %	91

Curtis & Tompkins, L

LABORATORY NUMBER: 124544
CLIENT: S.R. HANSEN & ASSOCIATES
LOCATION: CARGILL RAINWATER

DATE SAMPLED: 02/23/96
DATE RECEIVED: 02/23/96
DATE ANALYZED: 02/26/96
DATE REPORTED: 03/07/96

ANALYSIS: TOTAL DISSOLVED SOLIDS
ANALYSIS METHOD: EPA 160.1

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
124544-001	RWC CRYSTALLIZER	31,300	mg/L	100
METHOD BLANK	N/A	ND	mg/L	10

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SAMPLE DUPLICATE OF 124516-001

RPD, %	6

S.R. HANSEN & ASSOCIATES

124544

CHAIN OF CUSTODY RECORD

PROJECT NAME/SITE:: Cargill Rainwater			Redwood City			TYPE OF ANALYSIS	PRESERVATIVE/ COMMENTS
SAMPLERS: (SIGNATURE)							
DATE	TIME	COMPOSITE/ GRAB	SITE LOCATION	#/SIZE/TYPE OF SAMPLE CONTAINERS			
2-23-96		G	RWC	1 X 2L	HDPE	Total dissolved Solids	
						BOD (5 day)	
							NO preservative

RELINQUISHED BY: (SIGNATURE) DATE/TIME 2/23/96 2:40pm RECEIVED BY: (SIGNATURE) Danara Moore

RELINQUISHED BY: (SIGNATURE) DATE/TIME RECEIVED BY: (SIGNATURE)

4085 Nelson Avenue, Suite I • Concord, CA 94520 • (510) 687-5400 • Fax (510) 687-2296

Quanterra Environmental Services

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

March 20, 1996

QUANTERRA PROJECT NUMBER: 086633
PO/CONTRACT: NA

Gary Wortham
S.R. Hansen & Associates
4085 Nelson Avenue, Suite I
Concord, CA 94520

Dear Mr. Wortham:

This report contains the analytical results for the one aqueous sample which was received under chain of custody by Quanterra Environmental Services on 06 March 1996. This sample set is associated with your Cargill Salt project.

The case narrative is an integral part of this report.

If you have any questions, please call me at (916)374-4357.

Sincerely,

Vicki Hess
for

David J. Herbert
Project Manager

DJH/jas

Enclosures

Quanterra
Environmental Services

TABLE OF CONTENTS

QUANTERRA PROJECT NUMBER 086633

Quanterra
Environmental Services

CASE NARRATIVE

QUANTERRA PROJECT NUMBER 086633

Selected Metals - Various Methods

All reporting limits were raised due to matrix interference.

No other anomalies were associated with this report.

Quanterra
Environmental Services

QUANTERRA'S QUALITY ASSURANCE PROGRAM

Quanterra has implemented an extensive Quality Assurance (QA) program to ensure the production of scientifically sound, legally defensible data of known documentable quality. A key element of this program is Quanterra's Laboratory Control Sample (LCS) system. Controlling lab operations with LCS (as opposed to matrix spike/matrix spike duplicate samples), allows the lab to differentiate between bias as a result of procedural errors versus bias due to matrix effects. The analyst can then identify and implement the appropriate corrective actions at the bench level, without waiting for extensive senior level review or costly and time-consuming sample re-analyses. The LCS program also provides our client with information to assess batch, and overall laboratory performance.

Laboratory Control Samples - (LCS)

Laboratory Control Samples (LCS) are well-characterized, laboratory generated samples used to monitor the laboratory's day-to-day performance of routine analytical methods. The results of the LCS are compared to well-defined laboratory acceptance criteria to determine whether the laboratory system is "in control". Three types of LCS are routinely analyzed: Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks. Each of these LCS are described below.

Duplicate Control Samples. A DCS is a well-characterized matrix (blank water, sand, sodium sulfate or celite) which is spiked with certain target parameters and analyzed at approximately 10% of the sample load in order to establish method-specific control limits.

Single Control Samples. An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g. metals or conventional analyses) a single control sample identical to the DCS serves as the control sample. An SCS is prepared for each sample lot. Accuracy is calculated identically to the DCS.

Method Blank Results. A method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
S.R. Hansen & Associates

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
086633-0001-SA	Cargill Salt	AQUEOUS	23 FEB 96		06 MAR 96

S.R. HANSEN & ASSOCIATES

CHAIN OF CUSTODY RECORD

PROJECT NAME/SITE:: Cargill Salt — RWC Crystalliser

SAMPLERS: (*SIGNATURE*)

DATE	TIME	COMPOSITE/ GRAB	SITE LOCATION	#/SIZE/TYPE OF SAMPLE CONTAINERS		TYPE OF ANALYSIS	PRESERVATIVE/ COMMENTS
2-23-96		G	Redwood City	1 X 2000 ml	HDPE	Metals	HNO_3
							Analyze For:
							As, Cd, Cr, Cu, Pb,
							Hg, Ni, Ag, & Zn
							* Use lowest detection
							limits possible.

RELINQUISHED BY: (SIGNATURE) — DATE/TIME 3-1-96/0900 — RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE) — DATE/TIME 3/6/96 1045 — RECEIVED BY: (SIGNATURE) Peter Cargill

4085 Nelson Avenue, Suite I • Concord, CA 94520 • (510) 687-5400 • Fax (510) 687-2296

Quanterra
Environmental
Services

Selected Metals - Various Methods

Quanterra
Environmental Services

METALS

(Water - Total)

Client Name: S.R. Hansen & Associates
Client ID: Cargill Salt
Lab ID: 086633-0001-SA
Matrix: AQUEOUS Sampled: 23 FEB 96 Received: 06 MAR 96
Authorized: 06 MAR 96 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.020	6020-M	13 MAR 96	18 MAR 96
Cadmium	ND	mg/L	0.0050	6020-M	13 MAR 96	18 MAR 96
Chromium	ND	mg/L	0.0050	6020-M	13 MAR 96	18 MAR 96
Copper	0.010	mg/L	0.0050	6020-M	13 MAR 96	18 MAR 96
Lead	ND	mg/L	0.0050	6020-M	13 MAR 96	18 MAR 96
Mercury	ND	mg/L	0.00020	245.1	11 MAR 96	12 MAR 96
Nickel	0.011	mg/L	0.0050	6020-M	13 MAR 96	18 MAR 96
Silver	ND	mg/L	0.0050	6020-M	13 MAR 96	18 MAR 96
Zinc	ND	mg/L	0.010	6020-M	13 MAR 96	18 MAR 96

Note ! : All reporting limits raised due to interference created by high concentrations of dissolved solids.

Note 1 : Analysis date = 03/19/96

ND = Not detected
NA = Not applicable

Reported By: John Barnett Approved By: Barry Votaw

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

QC LOT ASSIGNMENT REPORT - MS QC
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Numbe (SA,MS,SD,DU)
086633-0001-SA	AQUEOUS	6020-M-AT	13 MAR 96-MX	13 MAR 96-M	13 MAR 96-M
086633-0001-SA	AQUEOUS	HG-CVAA-A	11 MAR 96-AX	11 MAR 96-A	11 MAR 96-A

Quanterra
Environmental Services

METHOD BLANK REPORT
Metals Analysis and Preparation
Project: 086633

Test: 6020-AALIST-AT ICPMS AALIST (As,Pb,Se,Tl,Sb,Cd,Cr,Cu,Ni,Ag, Zn)
Method: 6020-M
Matrix: AQUEOUS
QC Lot: 13 MAR 96-MX QC Run: 13 MAR 96-M

Analyte	Result	Units	Reporting Limit
Arsenic	ND	mg/L	0.0040
Cadmium	ND	mg/L	0.0010
Chromium	ND	mg/L	0.0010
Copper	ND	mg/L	0.0010
Lead	ND	mg/L	0.0010
Nickel	ND	mg/L	0.0010
Silver	ND	mg/L	0.0010
Zinc	ND	mg/L	0.0020

Test: HG-CVAA-AT Mercury, Cold Vapor AA (Total)
Method: 245.1
Matrix: AQUEOUS
QC Lot: 11 MAR 96-AX QC Run: 11 MAR 96-A

Analyte	Result	Units	Reporting Limit
Mercury	ND	mg/L	0.00020

ND = Not Detected

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Metals Analysis and Preparation
Project: 086633

Category: 6020-M-AT Metals by ICPMS
Test: 6020-AALIST-AT
Matrix: AQUEOUS
QC Lot: 13 MAR 96-MX
Concentration Units: mg/L

QC Run: 13 MAR 96-M

Analyte	Concentration Spiked	Measured	Accuracy(%) LCS	Limits
Antimony	0.200	0.214	107	80-120
Arsenic	0.200	0.194	97	80-120
Beryllium	0.200	0.172	86	80-120
Cadmium	0.200	0.191	95	80-120
Chromium	0.200	0.190	95	80-120
Cobalt	0.200	0.173	87	80-120
Copper	0.200	0.195	98	80-120
Iron	0.200	0.191	96	80-120
Lead	0.200	0.193	96	80-120
Molybdenum	0.200	0.206	103	80-120
Nickel	0.200	0.186	93	80-120
Selenium	0.200	0.198	99	80-120
Silver	0.200	0.191	95	80-120
Thallium	0.200	0.188	94	80-120
Tin	0.200	0.200	100	80-120
Zinc	0.200	0.192	96	80-120

Category: HG-CVAA-A Mercury by CVAA
Test: HG-CVAA-AT
Matrix: AQUEOUS
QC Lot: 11 MAR 96-AX
Concentration Units: mg/L

QC Run: 11 MAR 96-A

Analyte	Concentration Spiked	Measured	Accuracy(%) LCS	Limits
Mercury	0.00100	0.00106	106	80-119

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated resul

Quanterra
Environmental Services

MATRIX SPIKE/MATRIX SPIKE DUPLICATE MSQC REPORT
Metals Analysis and Preparation
Project: 086633

Category: 6020-M-AT Metals by ICPMS
Test : 6020-AALIST-AT Method: 6020-M
Matrix : AQUEOUS
Sample : 086633-0001
Units : mg/L Units Qualifier: Wet Weight
QC Lot : 13 MAR 96-MX MS Run: 13 MAR 96-M

Analyte	Sample Result	MS Result	MSD Result	Spiked MS/MSD	%Recovery MS	%Recovery MSD	Control Limits	%RPD	R Li
Arsenic	ND	0.228	0.212	0.200	114	106	75-125	7.2	2
Cadmium	ND	0.224	0.208	0.200	112	104	75-125	7.4	2
Chromium	ND	0.206	0.193	0.200	103	96	75-125	6.5	2
Copper	0.0101	0.221	0.222	0.200	105	106	75-125	0.47	2
Lead	ND	0.197	0.183	0.200	98	92	75-125	7.4	2
Nickel	0.0114	0.213	0.203	0.200	101	96	75-125	5.1	2
Silver	ND	0.203	0.189	0.200	102	94	75-125	7.1	2
Zinc	ND	0.216	0.219	0.200	108	110	75-125	1.4	2

Category: HG-CVAA-A Mercury by CVAA
Test : HG-CVAA-AT Method: 245.1
Matrix : AQUEOUS
Sample : 086642-0003
Units : mg/L Units Qualifier: Wet Weight
QC Lot : 11 MAR 96-AX MS Run: 11 MAR 96-A

Analyte	Sample Result	MS Result	MSD Result	Spiked MS/MSD	%Recovery MS	%Recovery MSD	Control Limits	%RPD	R Li
Mercury	0.000108 J	0.00114	0.00115	0.00100	103	104	75-125	0.97	3

J = Result is detected below the reporting limit or is an estimated concentration.
ND = Not Detected
Calculations are performed before rounding to avoid round-off errors in calculated results.